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USING PERSONAL COMPUTERS TO PROMOTE ECONOMIC DEVELOPMENT

PROJECT NUMBER 84-6268-05-25-22-R416

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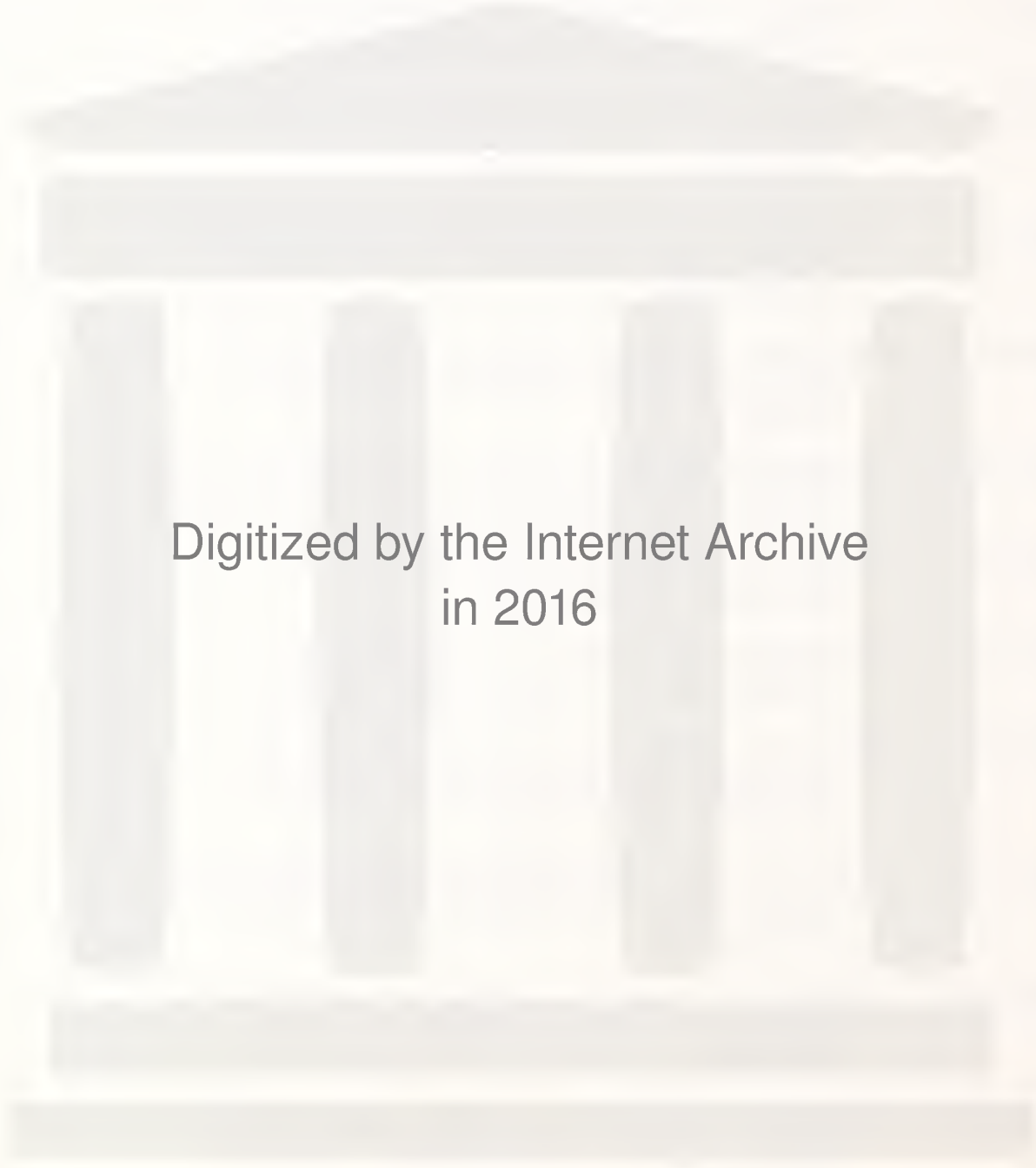

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I. INTRODUCTION

The Department of Vocational Education Services of the Office of Public Instruction (OPI) contracted with ECO Northwest, Ltd. (ECO) to study the feasibility of increasing economic development within Montana through the use of personal computers in small businesses. A statewide mail survey of 1,650 businesses (employing between 4 and 25 employees) was conducted to determine the current status of computer utilization and the potential for expanding computer use within the Montana business community.

This report presents the methods used to conduct the survey and a narrative of the survey results. Based on the results, conclusions are drawn concerning the feasibility and desire of small business entrepreneurs to expand access to computer use and training. The appendices contain the survey questionnaire and a description of the systematic sampling procedure used in this survey. Survey result frequency distributions and cross-tabulations are in the supplement to this report.

In conjunction with the small business survey, ECO is analyzing the software needs of specific types of businesses. Commercially available computer programs were evaluated to determine whether they met specific business needs or whether new software needed to be developed and tested. Four small

businesses are currently being used for field testing to determine whether the software selected fulfills the user's expectations. The results of the software evaluation and field testing will be presented in a future ECO report.

II. METHODOLOGY

A mail survey was used to collect information from Montana small businesses. On October 25, 1983, questionnaires (see Appendix A) were mailed to 1,650 businesses who employed between 4 and 25 employees. Approximately 10 days later (November 1, 1983), a postcard reminder was sent to everyone in the first mailing, serving as both a thank-you to those who had responded and as a courteous reminder for those who had not responded.*

The following sections describe the methods used to design, conduct, and interpret the results of this survey. These methods are based on accepted survey and statistical techniques (Dillman 1978; Simon 1978; Mueller et al. 1970; Erdos et al. 1970; Tull et al. 1973).

A. Sampling Design

A systematic sampling procedure (see Appendix B) was used to select a sample of 1,100 small businesses from the data base maintained by the Montana Employment Security Division. This file contains names and addresses of all Montana businesses which provide unemployment insurance to their

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*Don A. Dillman. Mail and Telephone Surveys, The Total Design Method (New York: John Wiley & Sons, 1978).

employees. This sample was restricted to only non-agricultural businesses with between 4 and 25 employees.

A sample size of 500 agri-businesses was selected from the data base maintained by the Montana Workers Compensation Division. This file contains names and addresses of all Montana businesses (including agriculturally related businesses) which maintain workers compensation for their employees. The sample was selected by a systematic sampling method (see Appendix B). Selection criteria were limited to businesses which had an SCI code related to agriculture and had workers compensation premium coverage equivalent to between 4 and 25 employees.

B. Questionnaire Design

The appearance, organization, content, and length of the mail questionnaire are important because these factors influence whether the respondent will react positively and complete the questionnaire as requested or discard it due to confusion, antagonism, or lack of interest. In using a mail questionnaire, there is no opportunity for an interviewer to obtain respondent cooperation or explain question meanings; consequently, the design of the questionnaire becomes critical to the success of the survey.

Dillman (1978) reported that one of the most important requirements for a successful survey design is that the questionnaire should create a feeling of personal

communication between the researcher and the respondent. A personalized approach conveys to the respondent the critical message that the study is important and that the respondent's participation is necessary for success of the survey.

One method of personalizing a survey is through a support letter on the front of the questionnaire (see Appendix A). In this survey, the support letter was signed by a notable person in each target group (agri-business and nonagri-business), stressed the value and overall importance of the survey, and requested that the respondent please take the time to complete and return the questionnaire. In addition to the support letter, a cover letter (see Appendix A) from the OPI was enclosed which explained the overall nature and usefulness of the study while assuring the respondent of confidentiality. This cover letter was individually signed by the Assistant Superintendent of the OPI as another means to introduce a "personal touch" to the survey.

The survey respondents were further encouraged to participate personally in the study by writing additional comments on the back of the questionnaire. Although no attempt was made to code these comments, they served a dual purpose of allowing the respondent to express any concerns not covered in the questionnaire and providing the OPI with additional information.

Although personalization was an important objective, other practical considerations were included in the survey

process. For example, the survey packet contained a preaddressed, postage-paid return envelope which reminded the respondent that there would be no cost and little inconvenience required to return the questionnaire. Most important, the actual survey instrument was kept as concise as possible to give the appearance that the questionnaire was easy to complete.

C. Pretesting

Even though a survey has been carefully designed, it is not always possible to predict how various groups will respond; therefore, pretesting is a necessary element in evaluating, modifying, and improving the final questionnaire. Pretesting allows the researcher to identify such problems as respondent's confusion about the meaning of questions or the inability of respondents to answer within the confines of the response categories that are provided.

A mock-up of each questionnaire was developed and pretested. Before the pretest questionnaire was mailed, telephone calls were made to 15 Helena area residents, asking them to assist in the pretest effort by completing the questionnaire. As another means of pretesting, the questionnaire was critiqued by otner individuals who understood the purpose of the study. Revisions in the survey were then made to reflect various problems and/or criticisms.

D. Analysis of the Data

Comprehensive and well designed data analysis procedures are essential for the interpretation of survey results as well as for the formulation of recommendations. Analytical procedures employed for this study were carefully selected to allow for statistically valid inferences to be drawn from the processed data. The following sections describe the measures which were taken to facilitate the process of the survey data.

1. Coding and Automation of Data

After the survey instrument was designed, pretested, and accordingly revised, the questionnaires were sent from the Helena Post Office to the respondents under a third class bulk mailing permit. The return envelopes were addressed to the Statistical Center at Montana State University in Bozeman where the return questionnaires were numbered and sorted by survey (e.g., nonagri-businesses and agri-businesses).

The following measures were taken into consideration when designing the questionnaire for efficient automation and analysis:

1) The questionnaires were printed in brown ink so the response, if written in blue or black ink (or even in pencil), would be more discernable for data keying.

2) A column identifier was placed next to each possible answer for more efficient data keying.

3) Close-ended questions were implemented to allow for less bias by the coder and to accelerate the coding process.

4) Answer categories for the questions were limited to a minimum number of responses so that tabulations would be more meaningful and easily interpreted.

2. Tabulating, Editing, and Summarizing

After automating the data, a statistical computer package (SPSS) was used to generate frequency distributions and descriptive statistics for each of the survey categories. Once the survey data had been tabulated, further editing and outlier analyses were performed on those categories that had responses which were not in the predefined range. The data were then changed if it appeared there was a keypunching error. The data were counted as missing if the values were not identifiable.

3. Inferences

a. Estimation. This study was primarily concerned with determining the proportion of the population which answered in a particular way. In general, the procedure used to estimate population proportions is quite simple. Each population (e.g., agri-business or nonagri-business) was sampled and an estimate of the population proportion was made on the basis of the proportion in the sample.

These estimates are accurate only to the extent that the nonsampling errors (respondent refusals, inability to contact all respondents, and imperfections in questionnaire design) have been minimized and that the sample is representative of the true population. It is often more useful to give estimates of population proportions in terms of a range of values. This range (confidence interval) designates an interval within which the true population proportion is expected to lie in a determined percentage of all possible cases. Table 1 illustrates the maximum length of confidence intervals for any proportion from the populations surveyed. The maximum standard error is determined by assuming the true population proportions are equal to .5, the value that maximizes the standard error.

b. Variable Relationships. After examining the distribution of each of the variables, sets of relationships among two or more variables were investigated. These relationsips were analyzed using contingency table analysis (cross-tabulations or joint frequency distributions). The cross-tabulation analysis not only yields frequency distribution estimates, but also provides statistics designed to measure whether or not the variables are statistically independent. Furthermore, measures are given from the computer output which describe the degree to which the values of one variable are related or are independent of the values for the

TABLE 1

MAXIMUM 95% CONFIDENCE INTERVALS
(NORMAL APPROXIMATION)

Survey	Estimated* Population Size	Sample Size	Responses	Max Standard Error	95%** Confidence Interval
Agri	1,000	500	241	.0158	.033
Nonagri	15,000	1,100	549	.0210	.042

Note: *With between 4 and 25 employees.
**As an example, if the proportional estimate for some response is 47%, then the 95% confidence interval for P (the true proportion) is given by ($42.5\% \leq P \leq 51.5\%$)

second variable (e.g., Chi Square). The supplement to this report contains the computer output of the frequency distributions and cross-tabulations.

4. Analysis of Nonresponse

The agri-business and nonagri-business groups were surveyed with a postal questionnaire mailed to names obtained from a governmental agency. This mailing list was considered confidential; therefore, it was not possible to identify individuals who had or had not responded. A postcard reminder (see Appendix A) was mailed to the respondents approximately 10 days after the original questionnaire was sent to improve the response rate. The nature of the subject matter elicited a large number of responses and there were essentially no emotional or distraught completions. The overall response rate was 49.9 percent for nonagri-businesses and 43.8 percent for the agricultural group (total combined response 47.9 percent). These response rates are exceptionally good as compared to many surveys in which a response of 20 percent is considered average and response rates as low as 10 percent are not uncommon.

In summary, based on the information available, there is no reason to believe that nonrespondents had different views to express than those who did respond. In any case, there was no possibility to conduct a standard statistical follow-up subsurvey of nonrespondents because of the confidentiality of the mailing lists.

III. RESULTS

A total of 790 of the 1,650 mailed questionnaires were completed, yielding a 47.9 percent response rate. Of the 790 questionnaires, 241 were completed by the agri-businesses 549 by the nonagri-businesses, yielding 43.8 percent and 49.9 percent response rates, respectively. The results of these two surveys are summarized in the following sections.

A. Agri-Business Survey

Thirty-one of the 241 respondents (12.9 percent) indicated they own a computer for business operations, whereas 13 (5.4 percent) lease a computer, and 197 (81.7 percent) do not use a computer in their business operations. Of the 31 respondents who own a computer, three (9.7 percent) own a mini computer and 26 (83.9 percent) own a personal computer (two respondents did not specify). Six (46.2 percent) of the agri-business respondents who do not own their computer lease a mini computer and three (23.6 percent) lease a personal computer (four did not specify). Mini computer examples which were given in the questionnaire answer category included IBM 38, IBM 34, IBM 32, IBM Data Master, and Wang, whereas the personal computer examples were Radio Shack, IBM PC, Apple, Commodore, and other.

Table 2 ranks from high to low the primary functions of the computer in the respondent's business operations. These

TABLE 2

PRIMARY FUNCTIONS OF COMPUTER
IN OPERATION OF AGRI-BUSINESSES

	Own		Lease	
Primary Function	Number of Respondents	Percent	Number of Respondents	Percent
Accounting/Tax Records	26	83.9	9	69.2
Word Processing	14	45.2	1	7.7
Other	12	38.7	3	23.1
Payroll	9	29.0	4	30.8
Inventory	9	29.0	2	15.4

Note: There were 31 respondents who own their business computer and 13 who lease their computer. The question asked the respondents to indicate the computer's primary functions; therefore, respondents could have answered in more than one category. The percent is based on the respondent number of 31 (own) or 13 (lease).

primary functions are cross-tabulated with computer ownership. Both those respondents who own and lease identified "accounting/tax records" as the primary function of their computer (83.9 and 69.2 percent, respectively).

Twenty-eight respondents (68.3 percent) were "very satisfied" with their computer, whereas 12 (29.3 percent) indicated they were "somewhat satisfied," and 1 (2.4 percent) answered "not satisfied." The respondents also were asked to rate their satisfaction with their software programs and the following responses were given: 15 (39.5 percent) "very satisfied," 22 (57.9 percent) "somewhat satisfied," and 1 (2.6 percent) "not satisfied." Question 5 asked the respondents whether the computer programs that they used were purchased or customized to fit their specific needs. Sixteen (36.4 percent) used customized programs, and 29 respondents (65.9 percent) used purchased software. Table 3 presents the cross-tabulations of computer ownership with the type of software used and satisfaction with software. For example, 25 (80.6 percent) of the 31 operators who owned computers used purchased software programs, and four (30.8 percent) of the 13 operators who leased computers used purchased software programs. A few of the respondents answered in both categories--purchased and customized software programs.

Of the 197 respondents who do not use a computer in their business operations, 138 (71.9 percent) indicated that they had considered using a computer. Table 4 ranks factors

TABLE 3

TYPE OF SOFTWARE USED AND LEVEL OF SOFTWARE SATISFACTION OF AGRI-BUSINESS RESPONDENTS

Software Type and Satisfaction	Own		Lease	
	Number of Respondents	Percent	Number of Respondents	Percent
A. Type of Software Programs				
Purchased	25	80.6	4	30.8
Customized	10	32.3	6	46.2
Total	35*	112.9	10**	77.0
B. Satisfaction with Software Programs				
Very Satisfied	9	29.0	6	46.2
Somewhat Satisfied	19	61.3	3	23.1
Not Satisfied	1	3.2	0	0.0
Total	29***	93.5	9****	69.3

Note: *Four respondents indicated that their computer programs were both purchased and customized. Percent is based on respondent number of 31 (total number who own computers).

**Three respondents did not answer this question. Percent is based on respondent number of 13 (total number who lease computers).

***Two respondents did not answer this question. Percent is based on respondent number of 31 (total number who own computers).

****Four respondents did not answer this question. Percent is based on respondent number of 13 (total number who lease computers).

TABLE 4

FACTORS WHY AGRI-BUSINESS RESPONDENTS DO NOT USE COMPUTERS IN BUSINESS OPERATIONS

Factors	Number of Respondents	Percent
Uncertainity Regarding Usefulness of Computer or Kind to Buy	146	73.0
Lack of Training	96	47.8
Cost Too High	66	32.8
Unavailability of Software Which has Application to Your Specific Needs	43	21.6
Computers Have No Application in My Business Operation	21	10.7

Note: There were 197 respondents who do not use a computer in their business operation. The question asked the respondents to indicate the factors that have kept them from using a computer; therefore, respondents could have answered in more than one category. The percent is based on the number of respondents who do not use a computer (197).

(provided as answer categories) that have kept the agri-business respondents from using a computer in their business operations. "Uncertainity regarding usefulness of computer or kind to buy" was the most prevalent response and "computers have no application in my business operation" was the least given response.

The 197 respondents who do not use a business computer were asked to rate the extent (great deal, somewhat, not at all) that they thought a computer could improve their business operations. The responses were as follows: 41 (21.2 percent) answered it would improve operations a "great deal," 119 (61.7 percent) indicated "somewhat," and 33 (17.1 percent) "not at all." Moreover, of the 138 respondents who had considered using a computer in their business operations, 37 (26.8 percent) thought the computer would improve their operation a "great deal," 94 (68.1 percent) indicated "somewhat," and three (2.2 percent) "not at all."

Approximately 50 percent (120 respondents) of the 241 agri-businesses were aware of computer training programs offered in their area. Table 5 presents data on the cross-tabulations of questions regarding computer ownership and the awareness of local computer training programs. The computer owner and the non-computer user respondents were almost evenly divided in their awareness of local training programs. Of the 13 respondents who lease, 69.2 percent were aware and 30.8 percent were unaware of such computer programs.

TABLE 5

NUMBER OF AGRI-BUSINESS RESPONDENTS AWARE
OF LOCAL COMPUTER TRAINING PROGRAMS

Computer Training Awareness	Own		Lease		Do Not Use Computer	
	Number of Respondents	Percent	Number of Respondents	Percent	Number of Respondents	Percent
Aware	16	51.6	9	69.2	95	48.2
Not Aware	15	48.4	4	30.8	102	51.8
Total	31	100.0	13	100.0	197	100.0

Question 11 asked the respondents, "Would you or an employee be willing to attend training programs if they were offered in your area?" Of the 184 respondents (76.3 percent) who answered "yes," 27 (14.7 percent) owned a computer, 11 (6.0 percent) leased a computer, and 146 (79.3 percent) did not use a computer in their business operations.

Table 6 presents the number of miles the respondents would be willing to travel to attend computer training programs cross-tabulated with computer ownership. The distance that the respondent would be willing to travel to attend a local training program did not appear to be of great concern.

If instruction for a computer training program required nine classroom hours, most of the respondents (73 or 30.3 percent) preferred the instruction to be given in a one day (nine hour) session. Fifty-six respondents (23.2 percent) preferred one night (three hours each night) for three weeks, while 39 (16.2 percent) preferred three nights (three hours each night) for one week. About 30 percent (73 respondents) were not interested in attending sessions.

The last question asked the respondent to describe the type of business he/she operated. Although this question was open-ended (i.e., no answer categories were provided), for purposes of data analysis, the responses were divided into two categories--Ag-Forest-Oil and Technical. Twenty-three (9.5 percent) of the respondents were considered "Technical,"

TABLE 6

DISTANCE AGRI-BUSINESS RESPONDENTS WOULD TRAVEL FOR COMPUTER TRAINING PROGRAM

	Own		Lease		Do Not Use Computer	
Number of Miles	Number of Respondents	Percent	Number of Respondents	Percent	Number of Respondents	Percent
Less than 10 Miles	3	9.7	3	23.1	17	8.6
11 to 30 Miles	8	25.8	4	30.8	61	31.0
More Than 30 Miles	12	38.7	3	23.1	61	31.0
No Interest	8	25.8	3	23.1	58	29.4
Total	31	100.0	13	100.0	197	100.0

whereas 212 (88.0 percent) were "Ag-Forest-Oil." Table 7 shows that the majority of the respondents were identified as "Ag-Forest-Oil" business operators.

B. Nonagri-Business Survey

The majority (350 or 63.8 percent) of the nonagri-businesses surveyed do not use a computer in their business operations. Fifty-two respondents (9.5 percent) lease a computer and 147 (26.8 percent) own a computer. Of the 147 respondents who own a computer, 51 (34.7 percent) use a mini computer (e.g., IBM 38, IBM 34, IBM 32, IBM Data Master, Wang), while 81 (55.1 percent) use a personal computer (e.g., Radio Shack, IBM PC, Apple Commodore, Other). Nineteen (36.5 percent) of the 52 respondents who lease a computer indicated they use a mini computer and 23 (44.2 percent) use a personal computer.

The respondents were asked the primary functions of the computer in their business operations. Table 8 ranks from high to low the responses to this question cross-tabulated with computer ownership. Both those respondents who own and lease indicated "accounting/tax records" was the primary function of their computer (71.4 and 65.4 percent, respectively).

Of the 147 nonagri-businesses who own their computer, 98 (66.7 percent) were "very satisfied" with their computer, 39 (26.5 percent) were "somewhat satisfied," and three (2.0 percent) were "not satisfied." The responses for the nonagri-

TABLE 7

TYPE OF BUSINESS OPERATED BY
AGRI-BUSINESS RESPONDENTS

	Own		Lease		Do Not Use Computer	
Type of Business	Number of Respondents	Percent	Number of Respondents	Percent	Number of Respondents	Percent
Ag-Forest-Oil	27	87.1	9	69.2	176	89.3
Technical	4	12.9	4	30.8	15	7.6
Total	31	100.0	13	100.0	191*	96.9

Note: *Six business operators did not respond.

TABLE 8

PRIMARY FUNCTIONS OF COMPUTER IN OPERATION OF NONAGRI-BUSINESSES

	Own		Lease	
Primary Function	Number of Respondents	Percent	Number of Respondents	Percent
Accounting/Tax Records	105	71.4	34	65.4
Other	70	47.6	20	38.5
Payroll	57	38.8	22	42.3
Inventory	58	39.5	17	32.7
Word Processing	49	33.3	12	23.1

Note: There were 147 respondents who own their business computer and 52 respondents who lease their computer. The question asked the respondents to indicate the computer's primary functions; therefore, respondents could have answered in more than one category. The percent is based on the respondent number of 147 (own) and 52 (lease).

business operators who lease rather than own their computer were as follows: 34 (65.4 percent) "very satisfied," 18 (34.6 percent) "somewhat satisfied," none "not satisfied."

The respondents were asked two questions concerning their software programs--(1) whether their computer programs were purchased or customized, and (2) their level of satisfaction with the software programs (see Table 9 for cross-tabulation of these two questions with computer ownership). The majority of both those respondents who owned and leased their computers indicated they were satisfied with their software (87.8 and 86.5 percent, respectively). Moreover, 55 (45.8 percent) of the 120 respondents who used purchased software indicated they were "very satisfied" with the software, 52 (43.3 percent) were "somewhat satisfied", and 10 (8.3 percent) were "not satisfied." Of the 96 respondents who used customized software, 46 (47.9 percent) answered they were "very satisfied" with the software, 42 (43.8 percent) indicated "somewhat satisfied," and 5 (5.2 percent) "not satisfied."

When the 350 respondents who do not use a computer in their business operations were queried whether they had considered using a computer, 262 (76.8 percent) answered "yes" and 79 (23.2 percent) "no." Approximately 36 percent (125 respondents) of the 350 noncomputer users thought a computer could improve their business operation a "great deal," 169 (48.0 percent) indicated "somewhat" improvement, and 58 (16.5 percent) answered "not at all."

TABLE 9

TYPE OF SOFTWARE USED AND LEVEL OF SOFTWARE SATISFACTION OF NONAGRI-BUSINESS RESPONDENTS

Software Type and and Satisfaction	Own		Lease	
	Number of Respondents	Percent	Number of Respondents	Percent
A. Type of Software Programs				
Purchased	92	62.6	25	48.1
Customized	68	46.3	27	51.9
Total	160*	108.9	52	100.0
B. Satisfaction With Software Programs				
Very Satisfied	67	45.6	23	44.2
Somewhat Satisfied	62	42.2	22	42.3
Not Satisfied	11	7.5	2	3.8
Total	140**	95.3	47***	90.3

Note: *Thirteen respondents indicated that their computer programs were both purchased and customized. Percent is based on respondent number of 147 (total number who own computers).

**Seven did not respond. Percent based on respondent number of 147.

***Five did not respond. Percent based on respondent number of 52.

The factors (provided in answer categories) that have kept the nonagri-business operators from using a computer in their business operation are ranked from high to low in Table 10. The answer receiving the most number of responses was "uncertainity regarding usefulness of computer or kind to buy," and the answer receiving the lowest response was "computers have no application in my business.

Question 10 asked the respondents if they were aware of any computer training programs offered in their area. More respondents were aware rather than unaware of local training programs (see Table 11). Approximately 73 percent of the 52 operators who lease computers were aware of such programs as compared to 59.2 percent of the 147 who own computers and 56.3 percent of the 350 who do not use computers in their business operations.

Seventy-nine percent (435 respondents) of the 549 nonagri-business operators indicated that they or an employee would be willing to attend a training program offered in their geographic area. Moreover, when asked the distance they would be willing to travel to attend such a program, 156 (28.4 percent) answered "less than 10 miles," 125 (22.8 percent) indicated "11 to 30 miles," and 126 (23.0 percent) "more than 30 miles" (142 or 25.9 percent were not interested). Table 12 presents the cross-tabulation of the distance question with

TABLE 10

FACTORS WHY NONAGRI-BUSINESS RESPONDENTS DO NOT USE COMPUTERS IN BUSINESS OPERATIONS

Factors	Number of Respondents	Percent
Uncertainity Regarding Usefulness of Computer or Kind to Buy	184	51.7
Cost Too High	171	47.6
Lack of Training	105	29.6
Unavailability of Software Which Has Application to Your Specific Needs	69	19.3
Computers Have No Application in My Business Operation	42	12.0

Note: There were 350 respondents who do not use a computer in their business operation. The question asked the respondents to indicate the factors that have kept them from using a computer; therefore, respondents could have answered in more than one category. The percent is based on the number of respondents who do not use a computer (350).

TABLE 11

NUMBER OF NONAGRI-BUSINESS RESPONDENTS AWARE OF LOCAL COMPUTER TRAINING PROGRAMS

Computer Training Awareness	Own		Lease		Do Not Use Computer	
	Number of Respondents	Percent	Number of Respondents	Percent	Number of Respondents	Percent
Aware	87	59.2	38	73.1	197	56.3
Not Aware	60	40.8	14	26.9	153	43.7
Total	147	100.0	52	100.0	350	100.0

TABLE 12

DISTANCE NONAGRI-BUSINESS RESPONDENTS WOULD TRAVEL FOR COMPUTER TRAINING PROGRAM

	Own		Lease		Do Not Use Computer	
Number of Miles	Number of Respondents	Percent	Number of Respondents	Percent	Number of Respondents	Percent
Less Than 10 Miles	32	21.8	13	25.0	111	31.7
11 To 30 Miles	33	22.4	9	17.3	83	23.7
More Than 30 Miles	40	27.2	13	25.0	73	20.9
No Interest	42	28.6	17	32.7	83	23.7
Total	147	100.0	52	100.0	350	100.0

computer ownership. The distance that the respondent would be willing to travel to attend a training program is almost evenly divided among all groups (computer owners, computer leasees, and noncomputer users).

Most of the 549 respondents (165 or 30.1 percent) preferred a one day (nine hour) training session as opposed to one night (three hours) for three weeks (preferred by 137 respondents or 25.0 percent), or three nights (three hours each night) for one week (preferred by 99 respondents or 18.0 percent). Twenty-seven percent (148 respondents) indicated they were not interested.

The final question asked "What type of business do you operate?" This question was open-ended (i.e., no answer categories were provided); however, for data analysis purposes, the responses were divided into the following categories: Ag-Forest-Oil, Technical, Bank-Insurance-Real Estate, Construction-Manufacturing, Automotive, General Sales, Food, Professional, and other. Table 13 shows the type of business cross-tabulated with computer ownership.

TABLE 13

TYPE OF BUSINESS OPERATED BY
NONAGRI-BUSINESS RESPONDENTS

Type of Business	Own		Lease		Do Not Use Computer	
	Number of Respondents	Percent	Number of Respondents	Percent	Number of Respondents	Percent
Ag-Forest-Oil	12	8.2	8	15.4	41	11.7
Technical	4	2.7	0	0.0	1	0.3
Bank-Insurance-Real Estate	19	12.9	8	15.4	20	5.7
Construction-Manufacturing	23	15.6	8	15.4	33	9.4
Automotive	13	8.8	6	11.5	40	11.4
General Sales	11	7.5	4	7.7	46	13.1
Food	8	5.4	5	9.6	52	14.9
Professional	18	12.2	5	9.6	44	12.6
Other	34	23.1	8	15.4	55	15.7
Total	142*	96.4	52	100.0	332**	94.8

Note: *Five business operators did not respond.
**Eighteen business operators did not respond.

IV. CONCLUSIONS

The results of the small business survey were discussed in the previous chapter (III. Results). Because the results were similar between the agri-business and nonagri-business sectors, the general conclusions discussed in this section regard the survey as a whole.

Most of the small businesses surveyed do not use a computer for business operations. A large number of these business operators, however, have considered using a computer. There is evidence from the survey results that the majority of these non-computer users think a computer could improve their business operation.

Both the agri-business and nonagri-business respondents indicated that the primary reason they have not used a computer is the uncertainty regarding the usefulness of a computer or the kind of computer to purchase. The least given factor that has kept these business operators from using a computer was that the computer has no application in their business operation.

The more prevalent type of computer used by the small business operators was the personal computer (Radio Shack, IBM PC, Apple, Commodore, Other). Approximately one-third of the respondents used mini computers (IBM 38, IBM 34, IBM 32, IBM Data Master, Wang). Almost all of the operators were either very or somewhat satisfied with their computer.

The agri-business and nonagri-business responses both identified accounting/tax records as the primary function of their computer. The least used function was divided between inventory for the agri-business respondents and word processing for the nonagri-business respondents.

The computer programs more often used by the small business operators were almost evenly divided between purchased and customized; however, purchased programs ranked slightly higher than customized. Some respondents indicated that they used both purchased and customized software. Only a few of the respondents indicated they were not satisfied with the overall performance of their software programs.

The responses were almost evenly divided between those business operators who were aware and those who were unaware of computer training programs offered in their areas. There were more respondents, however, who were aware of the availability of the programs. There was a strong interest in business operators willingness to attend training programs if the programs were offered locally. When questioned as to the number of miles they would be willing to travel to attend such programs, distance did not appear to be of great concern. Answers were closely divided among the three answer categories (less than 10 miles, 11 to 30 miles, and more than 30 miles),

with a slightly higher number of responses being in the more than 30 mile category. It should be noted that this was true only when the survey was treated as one. When the results were divided into two surveys, the nonagri-business responses were slightly higher in the less than 10 mile category and the agri-business responses slightly higher in the more than 30 mile category.

If the respondents were interested in attending training programs, most preferred that the instruction be given in a one day (nine hour) session. The next preference of instruction was one night (three hours) for three weeks, and the least preferred was three nights (three hours each night) for one week.

In summary, although the majority of the businesses surveyed do not use a computer in their business operations, it appears there is a favorable potential for expanding the use of computers in Montana small businesses. Business operators' interest in computers and their willingness to learn the necessary computer skills should provide a good environment in which to promote expanded computer utilization within Montana.

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APPENDIX A

SURVEY PACKET

1. SURVEY COVER LETTER

OFFICE OF PUBLIC INSTRUCTION

STATE CAPITOL
HELENA, MONTANA 59620
(406) 449-3095

Ed Argenbright
Superintendent

October 24, 1983

Dear Businessperson:

Personal computer use by many segments of our society has expanded due to increased availability, improved technology, and reasonable costs of computers. There are, however, still some businesses who do not rely on computers because of lack of information, training, or availability of applicable software.

You are one of a select number of people who are being asked their opinion on this matter. Your name was drawn in a random sample of the members of your profession. In order that the results will truly represent the thinking of the people of Montana, it is important that each questionnaire be completed and returned. The questionnaire will be analyzed at the Statistical Center at Montana State University.

The results of this survey will be used to determine the feasibility of expanding economic growth in small businesses by increasing the use of personal computers. A copy of the research findings will be on file at the Office of Public Instruction.

You may be assured of complete confidentiality. Your name will never be placed on the questionnaire nor will the mailing list for this survey ever be released to anyone by us.

I would be most happy to answer any questions you may have regarding this survey. Please call 449-2410. Thank you for your assistance.

Sincerely,

Gene R. Christiaansen
Project Director

Enclosure

2. QUESTIONNAIRE

DEPARTMENT OF COMMERCE

TED SCHWINDEN GOVERNOR

CAPITOL STATION
1424 9TH AVENUE

STATE OF MONTANA

(406) 449-3494

HELENA, MONTANA 59620-0401

October 24, 1983

Dear Businessperson:

The Office of Public Instruction is conducting a survey to determine the utilization of computers by the business community in our State. The results of this survey will assist them in determining the feasibility of using computers to increase economic development for small businesses in Montana.

Please take a few minutes of your time to complete the attached questionnaire so that they will receive a representative response from the small businesses across our State.

Thank you for your cooperation.

Sincerely,

Gary Buchanan
DIRECTOR

PERSONAL COMPUTERS IN SMALL BUSINESSES SURVEY

INSTRUCTIONS: Please put an "X" in the appropriate box for each question.

Q-1 Does your business own or lease a computer for business operations?

1) OWN ☐
2) LEASE OR TIME SHARE ☐
3) DO NOT USE A COMPUTER ☐

IF YOU DO NOT USE A COMPUTER, PLEASE SKIP TO Q-7

Q-2 What type of computer (hardware) does your business use?

1) MINI COMPUTER (IBM 38, IBM 34, IBM 32, IBM DATA MASTER, WANG) ☐
2) PERSONAL COMPUTER (RADIO SHACK, IBM PC, APPLE, COMMODORE, OTHER) ☐

Q-3 What are the primary functions of this computer in your business operation?

1) ACCOUNTING/TAX RECORDS ☐
2) WORD PROCESSING ☐
3) INVENTORY ☐
4) PAYROLL ☐
5) OTHER ☐

Q-4 How would you rate your overall satisfaction with your computer?

1) VERY SATISFIED ☐
2) SOMEWHAT SATISFIED ☐
3) NOT SATISFIED ☐

Q-5 Are the computer programs (software) that you use purchased or customized to fit your specific needs?

1) PURCHASED ☐
2) CUSTOMIZED ☐

Q-6 How would you rate your overall satisfaction with your software programs?

1) VERY SATISFIED ☐
2) SOMEWHAT SATISFIED ☐
3) NOT SATISFIED ☐

PLEASE SKIP TO Q-10

Q-7 Have you considered using a computer in your business operation?

1) YES ☐
2) NO ☐

Q-8 Which of the following factors have kept you from using a computer in your business operation?

1) LACK OF TRAINING ☐
2) UNAVAILABILITY OF SOFTWARE WHICH HAS APPLICATION TO YOUR SPECIFIC NEEDS ☐
3) COST TOO HIGH ☐
4) UNCERTAINTY REGARDING USEFULNESS OF COMPUTER OR KIND TO BUY ☐
5) COMPUTERS HAVE NO APPLICATION IN MY BUSINESS OPERATION ☐

Q-9 To what extent do you think a computer could improve your business operation?

1) GREAT DEAL ☐
2) SOMEWHAT ☐
3) NOT AT ALL ☐

Q-10 Are you aware of any training programs that are offered in your area?

1) YES ☐
2) NO ☐

Q-11 Would you or an employee be willing to attend training programs if they were offered in your area?

1) YES ☐
2) NO ☐

IF NO, SKIP TO Q-14

Q-12 How far would you be willing to travel to receive instruction?

1) LESS THAN 10 MILES ☐
2) 11 TO 30 MILES ☐
3) MORE THAN 30 MILES ☐

Q-13 If the instruction required 9 hours of classroom training, would you prefer:

1) 1 NIGHT (3 HOURS) FOR 3 WEEKS ☐
2) 3 NIGHTS (3 HOURS EACH NIGHT) FOR 1 WEEK ☐
3) 1 ALL DAY (9 HOUR) SESSION ☐

Q-14 What type of business do you operate?

_____

PLEASE SEE INSTRUCTIONS ON BACK PAGE

Is there anything else you would like to tell us about computers in business operations? If so, please use this space for that purpose.

Your contribution to this effort is greatly appreciated. If you would like to see the summary of results, a copy will be on file at the Office of Public Instruction in Helena, Montana.

CHAMPION CLASP NO. 90 9 x 12

3. REMINDER POSTCARD

A few days ago you received a short questionnaire concerning computer use in businesses from the Office of Public Instruction. If you have already completed and returned it, please accept our sincere thanks. If not, please take a few minutes and do so today. Because it has been sent to only a select, but representative, sample, it is important that your information also be included in the study to complete a picture of the opinions of the business community.

Thank you for your help.

Sincerely,

Gene R Christiaansen

Gene R. Christiaansen
Office of Public Instruction

APPENDIX B

SYSTEMATIC SAMPLING PROCEDURE

SYSTEMATIC SAMPLING PROCEDURE

Simple Random Sampling

The objective of a sample survey is to make an inference about the population of interest based on information contained in a sample. Two factors affect the quantity of information contained in the sample, and, hence, affect the precision of our inference-making procedure. The first is the size of the sample selected from the population. The second is the amount of variation in the data; this can frequently be controlled by the method of selecting the sample. The procedure for selecting the sample is called the sample survey design. For a fixed sample size, n, we will consider various designs or sampling procedures for obtaining the n observations in the sample. Since observations cost money, a design which provides a precise estimator of the parameter of interest for a fixed sample size yields a savings in cost to the experimenter.

Definition: If a sample of size n is drawn from a population of size N in such a way that every possible sample of size n has the same chance of being selected, the sampling procedure is called simple random sampling.

Systematic Sampling

Definition: A sample obtained by randomly selecting one element from the first k elements in the frame

> and every kth element thereafter is called a one-in-k systematic sample.

Systematic sampling provides a useful alternative to simple random sampling for the following reasons:

> Systematic sampling is easier to perform and hence is less subject to interviewer errors than simple random sampling.
>
> Systematic sampling often provides greater information per unit cost than does simple random sampling.

In general, systematic sampling involves random selection of one element from the first k elements and then selection of every kth element thereafter. This procedure is easier to perform and usually less subject to interviewer error than is simple random sampling. For example, it would be dificult to use simple random sampling to select a sample of n=50 shoppers on a city street corner. The interviewer could not determine which shoppers to include in his sample because he would not know the population size, N, until all shoppers had passed the corner. In contrast, he could take a systematic sample (say one in 20 shoppers) until the required sample size was obtained. This would be an easy procedure for even an inexperienced interviewer to follow.

In addition to being easier to perform and less subject to interveiwer error, systematic sampling frequently provides more information per unit cost than does simple random sampling. A systematic sample is frequently spread more uniformly over the entire population and thus can provide more information about the population than an equivalent amount of data contained in a simple random sample. Consider the following illustration: We wish to select a one-in-5 systematic sample of travel vouchers from a stack of N=1,000 (that is, sample n=200 vouchers) to determine the proportion of vouchers filed incorrectly. A voucher is drawn at random from the first five vouchers (for example #3), and every fifth voucher thereafter is included in the sample.